

University Honors Program

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Toddler Language Skills: The
Predictor of Language and Proliteracy
Skills at Five Years

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Toddler Language Skills: The Predictor of Language and Preliteracy Skills at Five Years

A Thesis Submitted to the

University Honors Program

In Partial Fulfillment of the

Requirements of the Baccalaureate Degree

With Upper Division Honors

Department of

Communicative Disorders

By

Kailynne Hillenburg

DeKalb, Illinois

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Abstract:

Purpose: The purpose of this study was to analyze language skills present at 18 to 22 months that may indicate the language skills, specifically preliteracy skills, the child will possess at five years of age. This was determined by evaluating the language of children when they were toddlers and again when they were five. **Method:** Five monolingual, middle-class, American English speaking subjects participated in a play session with their caregiver when they were between the ages of 18 to 22 months. Mean Length of Utterance and Type: Token Ratio, were determined from the resulting conversational speech sample. Additionally, vocabulary and developmental abilities were screened using the MacArthur Communicative Development Inventory: Words & Sentences and Ages and Stages Questionnaire, respectively. When the children were five, they were administered a standardized language test, the Comprehensive Evaluation of Language Fundamental-P2, a standardized pre-literacy test, the Comprehensive Test of Phonological Processing and their conversational speech was evaluated using Developmental Sentence Scoring. **Results:** Language skills at 18-22 months of age, which were all within normal limits, were not indicative of the children's performance at 5 years. **Discussion:** Five subjects were insufficient in providing reliable results for all measures especially since all subjects were normally developing.

Toddler Language Skills: The Predictor of Language and Preliteracy Skills at Five Years

The purpose of this study was to analyze language characteristics present between 18 to 22 months that may indicate the child's language skills, specifically preliteracy skills, at five years. It is important to have a clear understanding as to the typical development at each age range in order to ensure whether or not early intervention is needed as these skills have "a strong association with psychiatric/behavioral problems and [are] a powerful predictor of later learning problems" (Rescorla 1989). For example, some children who show specific expressive language delays by 2 years have a fifty percent change of having language, and therefore literacy problems (Rescorla 1989). Those who are language delayed "manifest a variety of syndromes, and the etiologies of their language delay are multiple ... language-delayed young children are seriously at risk for continuing language problems, learning disabilities, and psychiatric/behavioral disorders" (Rescorla 1989).

Early Language Development -18 months

Semantics refers to word meaning. By the time a child is 18 month old, he or she should have at least 50 words in their productive vocabulary. These words consist primarily of nouns although some verbs and adjectives are also intermixed (Hoff 2005). After the 50-word mark, children begin a vocabulary spurt referred to as fast mapping, "the ability to learn and retain new words with only minimal exposure" (Gershkoff-Stoew & Hahn, 2007), an ability essential in preliteracy skills.

Morphology is defined as being the smallest meaningful units of language while syntax refers to the set of rules which govern the sequence of words in utterances (Reed 2005).

Morphology and syntax have improved to include negation and the beginning of formulating their own sentences (Hoff 2005). One way to assess a child's morphological development is to

assess the length of his or her utterances (referred to as mean length of utterance or MLU) and evaluate the use of specific grammatical forms. Mean length of utterance, commonly referred to as MLU, is a way to analyze language and Rondal, Ghiotto, Bredart, & Bachelet depicted MLU as providing a "sharper image of the child's level of productive language" until the child reaches a MLU of 3.0 (Hoff 2005). MLU is determined by the number of morphemes divided by the number of utterances thereby providing a meaningful manner of analyzing grammatical development (Hoff 2005), thus predicting the child's syntactic production (Miller & Chapman, 1981). Brown (1973) conducted a study that outlined the expectations for children. He created stages of development that are still used today. Children in Brown's Stage 1 should have a MLU of approximately 1.75 in order to be considered typically developing. Furthermore, the child should also be able to formulate sentences which consist of negation, recurrence, negation in the forms of denial, rejection, and non-existence (Brown 1973). However, the child is considered typically developing if the MLU is between 1.0 and 2.0 for Stage I (Shipley 2004).

Additionally, semantic relations are also developing. During Brown's stage 1, the child should be able to use a sentence with the following structures: agent + action, action + object, agent + object, action + locative, entity + locative, possessor (object) + possession, entity + attributive, and demonstrative + entity (Brown 1973). Moreover, these children are also beginning to demonstrate verbal turn-taking skills (Hoff 2005).

Early Language Development - 24 months

Children at 24 months of age are typically comprehending around 500 words while producing approximately 200 (Hoff 2005). In a morphological, syntactical sense, these children are now producing sentences which maintain word order, are declarative, and telegraphic (Hoff 2005). Another exciting accomplishment during this phase is the beginning of two-word

combination usage and adding morphemes that are plural and possessive (Hoff2005). The verbs the child acquired by 18 months are expanding and some irregular past tense verbs have been added into the vocabulary by this time as well (Hoff 2005). Also present by 24 months is a further understanding of pragmatics and discourse. For example, these children should begin using imaginative, heuristic language. While there is some morpheme use by this time, it is important to understand that speech is primarily telegraphic due to the general omission of morphemes. For example, instead of saying "He's going down the slide," subject 22103 said "Down slide.

Type-Token ratio, TTR, is a way to measure functional vocabulary skills as it will show the variety of words the child has in his/her vocabulary (Shipley 2004). TTR has been further modified to show the number of different word roots as well as the total main body words the child knows. However, there is not normative data for children under 3 years in terms of TTR. The earliest normative data is at 3 years where 92.5 (26.1) different words and 204.9 (61.3) total words with a TTR of 0.45 (Morris), which must be taken into consideration when assessing TTR data for kids 18-22 months.

Language Development - 5 years

At five years, the expressive vocabulary, complexity of language, and sentence and word structures will be explored. Speech should be 100% intelligible by this time. Expressive vocabulary is further expanded due to the ability of using irregular plural forms of words and using morphology to infer the meanings of new words (Hoff2005).

In regards to syntax, or the structure of language, the subjects should be conjoining clauses by using words such as "when, but, so" and 20% of the utterances should be complex while there's multiple embeddings in 11% of the child's utterances (Hoff2005). Although some

sentences are produced with a passive voice, the use of subordination and coordination in sentences is increasing while utterances are typically five to eight words long (Hoff2005). In addition, primarily direct requests are used although some indirect requests are present (Hoff 2005).

Method:

Five monolingual American English middle-class toddlers between 18-22 months participated in a naturalistic play session with their caregiver for twenty minutes. Their speech was recorded and later orthographically transcribed and analyzed for MLU and TTR through the Systematic Analysis of Language Transcripts (SALT) Student Version 6.1. In addition each subject's language was assessed through formal tests that rely on parent report. Two were vocabulary tests: MacArthur Communicative Development Inventory: Words and Sentences (MCDI), Language Development Survey (LDS), and one was a criterion referenced developmental screening an Ages & Stages Questionnaire. As there is significant language development from 18 to 22 months, it is appropriate to consider breaking the language development into two groups: those that are 18 months and those that are 22 months.

When the subjects were five years of age, the Comprehensive Evaluation of Language Fundamentals-P2 and CTOPP were administered and scored by a graduate speech-language pathology (SLP) student. Additionally, a language sample was collected while the child played with his or her mother.. The resulting recording was orthographically transcribed to evaluate syntactic and morphological development.. These language samples were then scored through the use of the Developmental Sentence Scoring (DSS) that was done by two undergraduate students as well as a graduate SLP student for reliability purposes. This study is a qualitative description of the changes between the two age groups.

Results:

18-22 months

In regards to MLU, there was a range from 1.04 to 1.3 and unsurprisingly those at 18 months of age had a slightly lower MLU than those who were 22 months. MLU for those who were 18 months ranged from 1.04 to 1.26 with a mean of 1.08 while at 22 months MLU ranged from 1.3 to 1.36 with a mean of 1.33. According to Shipley, all five of these subjects are considered typically developing as 1.0 to 2.0 and considered normal (2004). However, it must also be taken into consideration that these subjects are just entering the stage and therefore may be slightly below the expected averages. See Table 1 for MLU results.

TTR ranged from 0.15-0.51 for those at 18 months with a mean of 0.34 in addition to the overall scoring which had a mean of 0.32. However, for the 22 month olds the scores ranged from 0.22 to 0.37 with a mean of 0.295. The number of different word roots for 18-22 months ranged from 26 to 78 with a mean of 53.6. For those that are 18 months, the scores ranged from 22 to 49 with a mean of 39.67. The 22 months olds ranged from 71-78 with a mean score of 74.5. Lastly, in regards to TTR, was the total number of main body numbers which ranged from 96 to 348 with a mean of 187.6. Those at 18 months had a large range from 96 to 176 while 22 months ranged from 194 to 348. The mean scores for total number of main body numbers are 132 and 271 respectively. A table of this data is presented in Table 2. There is no normative data for children under 3 in terms of TTR. However, we expect 3 year olds to use 92.5 (26.1) different words and 204.9 (61.3) total words with a TTR of .45 (Morris).

In regards to the formal method of testing, the number of vocabulary words checked on the MCDI was converted to a percentile rank. There was a large range of vocabulary between the children extending from 39 words to 236 words and a mean of 126.2 ; however, the range

slightly decreased if you compared 18 months to 22 months. At 18 months the range was 39 to 101 with a mean of 72.67 while those at 22 months of age ranged from 177 to 236 with a mean of 206.5. By converting the scores to percentile ranks, the two age groups can be compared more easily, because age is accounted for. The children scored between the 30th and 55th percentile indicating all of the subjects were within normal limits since they scored in between the 16th and 85th percentiles. See Table 3 for data.

The final assessment used for 18-22 months was the Ages and Stages Questionnaire which was completed by each subject's primary caregiver which asked questions regarding communication, gross motor skills, fine motor skills, problem solving, and personal social skills. This is a criterion referenced measure meaning that cut-off scores are used. If a child scores above the cut-off, there are no concerns in that developmental area. As is evident by the information presented in Table 4, the ranges presented here were not as extreme as in past measures. For communication skills, the ages ranged from 40 to 60 overall, 40 to 55 in 18 months, and 55 to 60 in 22 months. Gross motor skills ranged from 50 to 60 overall whereas fine motor skills ranged from 45 to 60. Problem solving skills ranged from 45 to 60 overall, 45 to 55 for 18 months, and 45 to 60 for 22 months. Finally, personal social skills ranged from 35 to 60 overall, 35 to 55 at 18 months, and 55 to 60 at 18 months.

5 years

For the CELF assessment, there were six components which consisted of core language, expressive language, language structure, sentence structure, word structure, and expressive vocabulary and is presented in Table 5. Core language had an overall range of 92 to 127 with a mean of 114. Expressive language had an overall range of 91 to 138 with a mean of 115.2. Language structure ranged from 94 to 133 with a mean of 115.6. For sentence structure, the

scores ranged from 105 to 125 with a mean of 115. For word structure, the overall range was 70 to 130 with a mean of 107. The alarmingly low word structure level of subject 22103 is questionable to me as the subject is falling at the bottom of the ranges in the other scores in this assessment but the scores are more closely related. For instance, in the category of expressive vocabulary, subject 22103 scores the lowest at 100 but the overall scores range from 100 to 140 with a mean of 114 and the next lowest score is 105.

While determining whether or not the subjects were outside of the norms for the CELF-P2, it was necessary to analyze the sentence structure portion. Here, the normative data exists from 85 to 115 and the SOT percentile exists at a score of 100. All of the subjects were above the SOT percentile in this particular test as the lowest score was 105.

The subjects were also assessed in regards to the Comprehensive Test of Phonological Processing (CTOPP). These scores ranged from 98 to 132. The mean score was 109.8. Exactly like CELF-P2, CTOPP was considered averaged at 100 while normative data exists from 85 to 115. In this regard, all of the subjects were around the SOT percentile as the lowest score was at 98.

DSS, the final assessment analyzed, consists of methodically scoring each component of speech. These scores ranged from 7.64 to 8.20. The mean score was 8.92 while the mode was 6.48. According to the normative data presented by Lee and Canter (1974), two of the subjects at 6.48 are close to the 10th percentile (6.80). The two mid-scoring subjects (7.64 and 7.9) are close to the 25th percentile (7.86) while the highest DSS score (8.20) is in between the 75th (7.86) and 90th (9.04) percentiles. Furthermore, the scores should not be the lone basis in determining whether or not a child is ready for dismissal from an intervention program or needing to begin an intervention program (Lee 1974). Rather, DSS is a way to measure language, on a syntactical

acquisition basis as it gives "weighted scores to a developmental order of pronouns, verbs, negatives, conjunctions, yes-no questions, and wh-questions" (Lee 1974). These scores are presented in Table 7.

Discussion:

In regards to finding certain language skills or lack thereof that may be indicative of the language skills present at 5 years, it appears as though concrete assumptions cannot be made from the specific measures that were obtained in this group of children. Further, only five children were tested. When looking at the 18 month old children, the one who scored the lowest on all measures 18109 is one of the top scorers in the tests given at 5 years of age. Additionally, the 22 month old child who scored at the higher end of the spectrum, 22103, characteristically had the lowest scores in tests administered at 5 years. Additionally, subject 22106 remained towards the high end of the comparisons between subjects on language skills at both ages analyzed showing that the strong language skills in comparison to the subject's peers present at 18-22 months was a strong indicator of the strong language skills the subject will have at 5 years in comparison to his peers.

All of the children were within normal limits on the initial measures. It is possible that given more children (some who score below normal limits), predictor variables will be more evident.

In regards to MLU, all of the subjects are within normal ranges and are within one standard deviation of the norm, which has been stated of being 0.99 to 1.64 for 18 months and 1.23 to 2.01 for 22 months (Shipley 2004). Hoff states that MLU is a good measure, until the ceiling is reached about 3.0, indicative of language skills later (2005).

For type-token ratio, it has been stated that the nOlm is 0.45 to 0.50 for kids three to eight years old and below that is indicative of an expressive language delay or disorder (Shibley 2004). However, since all of the subjects are younger than the age given, the results must be carefully interpreted.

Conclusion:

One of the reasons analyzing language when a child is young is important is because of the impact it will have on the rest of the child's life. For example, language at 18-22 months may be predictive of language the child will have by the time he/she enters school at 5 to 6 yrs of age. There are multiple studies which have discussed the likelihood of children who have problems with language prior to 3 years are one of the high risk groups to have reading disorders (Smith 2006). Literacy has been shown to be a building block on language skills that were acquired earlier and therefore a predictor as to the level of difficulty the child will have while learning how to read (Hoff 2005), a skill that must be mastered in order to be successful in today's society. Furthermore, this study did not have overwhelming results implying that a certain language characteristic or characteristics were the main way in which to interpret preliterate skills at 18-22 months.

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Data Relevant for 18-22 Months:

Table 1. Mean Length of Utterance (MLU) Results

Age (18 Months)	Sex	Mean Length of Utterance	Norm Values
18109	M	1,04	1.0-2.0
18113	M	1,24	1.0-2.0
18212	F	1,26	1.0-2.0

Age (22 Months)	Sex	Mean Length. of Utterance	Norm Values
22103	M	1,36	1.0-2.0
22106	M	1,36	1.0-2.0

Table 2 Type: Token Ratio (TTR)

Age (18 Months)	Sex	TTR	TTR-WR	TTR-MBW
18109	M	0,15	26	176
18113	M	0,35	44	124
18212	F	0,51	49	96

Age (22 Months)	Sex	TTR	TTR-WR	TTR-MBW
22103	M	0,22	78	348
22106	M	0,37	71	194

Key:

TTR: Type Token Ratio

TTR-WR: TTR Number of Different Word Roots

TTR-MBW: TTR Total Main Body Words

Table 3: MacArthur Communicative Development Inventory: Words & Sentences (MCDI)

Age (18 Months)	Sex	MCDI-Total	MCDI-%	Norm Values %
18109	M	39	30	16-85
18113	M	101	55	16-85
18212	F	78	35	16-85

Age (22 Months)	Sex	MCDI-Total	MCDI-%	Norm Values 0/0
22103	M	177	45	16-85
22106	M	236	55	16-85

Table 4: Ages and Stages Questionnaire

Age (In Months)	Sex	ASQ-C	ASQ-GM	ASQ-FM	ASQ-PSV	ASQ-PSC
18109	M	45	60	55	55	45
18113	M	55	50	55	50	50
18212	F	40	60	60	45	35

Age (22 Months)	Sex	ASQ-C	ASQ-GM	ASQ-FM	ASQ-PSV	ASQ-PSC
22103	M	60	60	55	60	60
22106	M	55	55	45	45	55

Key:

ASQ-C: Ages and Stages Questionnaire Communication
 ASQ-GM: Ages and Stages Questionnaire Gross Motor
 ASQ-FM: Ages and Stages Questionnaire Fine Motor
 ASQ-PSV: Ages and Stages Questionnaire Problem Solving
 ASQ-PSC: Ages and Stages Questionnaire Personal Social

Data Relevant for 5 years

Table 5: Comprehensive Evaluation of Language Fundamental- P2 (CELF)

Age (In Years)	Sex	CELF-CL	CELF-EL	CELF-LS	CELF-WS	CELF-SS	CELF-EV	Norm Values
18109	M	133	138	133	120	125	140	85-115
18113	M	112	121	120	110	110	110	85-115
18212	F	106	105	106	105	105	105	85-115
22103	M	92	91	94	70	110	100	85-115
22106	M	127	121	125	130	125	115	85-115

Key:

CELF -CL: Comprehensive Evaluation of Language Fundamental Core Language

CELF -EL: Comprehensive Evaluation of Language Fundamentals Expressive Language

CELF-LS: Comprehensive Evaluation of Language Fundamentals Language Structure

CELF -SS: Sentence Structure

CELF -WS: Word Structure

CELF-EV: Expressive Vocabulary

Table 6: Comprehensive Test of Phonological Processing

Age (5 years)	Sex	CTOPP-PP
18109	M	132
18113	M	104
18212	F	100
22106	M	98
22109	M	115

Key:

CTOPP-PP: Comprehensive Test of Phonological Processing- Phonemic Awareness